

EXPLORING RUSSIAN-AMERICAN TRADE THROUGH COMPARISON OF CHEMICAL XRF SIGNATURES OF GLASS FROM COLONIAL RUSSIAN SITES IN ALASKA AND THE *TAL'TSINKA* FACTORY IN CENTRAL SIBERIA

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As Russians ventured eastward from Siberia into the North Pacific and what is now Alaska, their dependence on native peoples for fur procurement necessitated a ready supply of glass beads and other trade items. The new colonies also required containers and window glass. This prompted the Irkutsk merchant Alexander Baranov and the glass chemist Erik Laxman to construct the *Tal'tsinka* glass factory in 1784 on the Angara River. It is believed that products from the factory supplied the first Russian settlements in Alaska. Before 1799, supplies for the Russian settlements were shipped directly from Okhotsk after a long, arduous overland haul. After 1799, there was increasing supply through trade with American vessels and from direct shipments via the port of Kronstadt. Recent years have seen the completion of important multi-disciplinary archaeological investigations of eighteenth and early nineteenth century sites both in the U.S. and Siberia. Glass specimens from archaeological collections in Alaska and from the *Tal'tsinka* factory present a unique opportunity to test hypotheses on trade and supply through the comparison of chemical signatures.

X-ray fluorescence (XRF) analysis is an effective technique for determining the composition of historic glass and the materials and methods used in production. XRF provides a quantitative compositional analysis of glass samples from major to trace elements, thereby enabling categorization and comparative study.

One of the primary components of glass is an alkali that acts as a flux. Erik Laxman was known to have formulated his products using sodium sulfate (Na_2SO_4) for the alkali. Common practice in Europe at that time was to use potash or potassium carbonate (K_2CO_3) as the flux. Therefore, the Irkutsk glass would carry a Na metal where the more common potash

glass would carry a K metal. If the Irkutsk glass was traded to Alaska, it would have the same chemical makeup and ratios of elements as the glass remaining in Russia. Specifically, Laxman's glass would have a lower potassium to calcium ratio than potash based glasses. A collection of glass shards recovered from Irkutsk and a similar collection from Castle Hill, Alaska were analyzed using non-destructive Thermo Scientific NITON x-ray fluorescence (XRF) analyzers. The samples were then paired to closely match for similar characteristics such as color, condition, and thickness. The ratios of the important elements in the glasses were compared to determine possible provenance. These results will be reported.